ABSTRACT

Charles University in Praque

Faculty of Pharmacy in Hradec Králové

Department of Biochemical Sciences

Candidate: Bc. Tereza Dědková

Supervisor: Prof. RNDr. Lenka Skálová, PhD.

Title of diploma thesis: Development of nematodes resistance to albendazole

Nematodoses, including haemonchosis, disease caused by *Haemonchus contortus*, are responsible for substantial losses in livestock farming. *Haemonchus contortus* inhabits the abomasum of small ruminants and causes anemia and gastritis. Currently available anthelmintics used to treat haemonchosis are ineffective in many breeds because the increasing incidence of multi-resistant strains of *Haemonchus* worldwide. Therefore, the research of the mechanism of drug resistance of these parasites is very actual and important. The aim of my work was to study whether short-term contact of eggs or adults of *Haemonchus* with anthelmintics can induce changes in sensitivity to the anthelmintic. Anthelmintic albendazole (ABZ) and its metabolite albendazole sulfoxide (ABZ.SO) were used. At first, the concentrations of ABZ and its metabolites were measured in feces from lambs treated with ABZ. Based on obtained results, the proper concentrations for *ex vivo* tests were chosen. In eggs, a moderate but significant increase in drug-sensitivity was occurred after 24 hours incubation with ABZ and ABZ.SO. Expression changes of selected genes in adult males and females of *Haemonchus* from two strains with different sensitivity to anthelmintics were compared. The genes for UDP-glucosyltrasferases (UGTs) were monitored. One group of adults of both genders and strains were exposed to culture medium with ABZ for 12 and 24 hours. ABZ-untreated group (controls), were exposed to culture medium without drugs for 12 and 24 hours. Significant change of gene expression was detected in the expression of UGT 7 females of resistant strain after incubation with ABZ for 24 hours.